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Managing a Decline
in Enlisted Endstrength

David M. Rodney

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This research memorandum investigates whether enlisted endstrength cuts can be implemented to meet the following objectives: The personnel structure of the Navy after the strength cuts should be stable, advancement opportunity should change as little as possible, and endstrength cuts should be taken without having to extend involuntary separations beyond current policy. The analysis shows that these goals can be met by phasing cuts over a number of years if the percentage of petty officers in the inventory is simultaneously increased by a small amount.

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ABTRACT

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gates whether enlisted endstrength cuts
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a small amount.

EXECUTIVE SUMMARY

One aspect of cuts in defense spending is a reduction in the number of personnel in the armed forces. This research memorandum analyzes how to cut enlisted endstrength without causing undue adverse consequences to remaining personnel inventories. It addresses the changes in expenditures, accession requirements, and promotion opportunity that would derive from changes in endstrength. The analysis clarifies how the magnitude of strength cuts can be coordinated with the timing of strength cuts and realignment of billet structure to ensure that the Navy may shift as smoothly as possible from one size to another.

The analysis is based on the output of a simulation model, PERMIT (Personnel Management Integration Tool), an inventory flow model that ages an inventory in both the short and long term. PERMIT simulates the effects and interaction of policy decisions over time.

Ideally, strength cuts would be managed to meet the following objectives:

- The personnel structure of the Navy after the strength cuts should be stable.

- Advancement opportunity should be changed as little as possible.

- Endstrength cuts should be taken without having to extend involuntary separations beyond current policy.

These goals can be met by phasing strength cuts over a number of years if the percentage of petty officers in the inventory is simultaneously increased by a small amount.

Results show that the length of time required to make strength cuts that meet the objectives will increase with the magnitude of the strength cut, as noted below in table I.

Table I. Time required for strength cuts

Endstrength alternatives	Size of end-strength cut	Required period of orderly implementation
490,000	25,000	3 years
480,000	35,000	4 years
460,000	55,000	5 years

If strength cuts are made more rapidly than the above guidelines, it will not be possible to meet all of the aforementioned objectives. In particular, either the Navy will have to make a substantial number of involuntary separations or future accession requirements will vary widely from one year to the next, as the Navy endeavors to attain desired endstrength. These fluctuations in accessions will cause variations in the numbers of experienced personnel as the inventory ages.

If endstrength is cut without any other policy initiatives, declines in advancement opportunity will occur as force size decreases. The advancement system is the process by which, inter alia, the Navy rewards its top performers. So, a decline in advancement opportunity will inhibit the ability of Navy management to reward its top performers. Declines in advancements can be offset either by increasing the share of petty officers authorized or through involuntary separations. This research memorandum analyzes the effect of an increase in petty officer levels from today's level of 67 percent petty officers to (a Congressionally authorized but underfunded level of) 71 percent petty officers. The results show that such an increase in the petty officer share seems appropriate for strength cuts of 30,000 to 50,000 personnel and would offset a large transitional decline in advancement opportunity that would occur as billets are removed from authorizations. Moreover, because Congress has authorized a richer mix of petty officers, the Navy may unilaterally implement such a policy, assuming funds are available.

The complexity of military compensation inhibits a precise computation of the savings that would accrue from endstrength cuts. This research memorandum addresses savings in regular military compensation (RMC) costs. RMC, which includes basic pay, retirement accrual, and allowances, amounts to approximately 80 percent of personnel costs, and current enlisted RMC expenditures are in excess of $10 billion each year. Projected annual steady-state RMC savings from a variety of endstrength cuts are noted in table II.

Table II. Steady-state RMC savings from endstrength cuts

Endstrength	Strength cut	Petty officer share (%)	Steady-state RMC savings (FY 1989 $ millions)
490,000	25,000	67	500
490,000	25,000	71	350
480,000	35,000	67	700
480,000	35,000	71	550
460,000	55,000	67	1,050
460,000	55,000	71	900

Table II notes that the increase in the mix of petty officers reduces RMC savings approximately $150 million each year. This cost needs to be considered in the context of total personnel costs and the benefits to be accrued from avoiding a major decline in advancement opportunity and its associated costs.

CONTENTS

TABLES

ILLUSTRATIONS

INTRODUCTION

In the current political environment, it appears very likely that defense spending will shrink during the next several years. One aspect of cuts in defense spending is a reduction in the number of personnel in the armed forces. The precise timing and size of reductions in personnel inventories have not been determined and will probably be the subject of much debate for months, if not years. The desire to attain specific cuts in spending in a specified time frame tends to be the driving force in determining the magnitude and timing of personnel cuts. Such budgetary imperatives may ignore the impact of sudden and radical changes in personnel authorizations on the long-term welfare of the armed forces. Personnel policy decisions may have long-term effects on the structure of military forces, and an inappropriate action may have unfortunate consequences for 20 years. Therefore, it is prudent to proceed with caution when making radical changes to authorizations. Every effort should be made to ensure that short-term savings do not lead to larger long-term costs. This research memorandum addresses Navy enlisted personnel and provides some guidance on how to cut endstrength without causing undue adverse consequences to remaining personnel inventories.

To understand the consequences of a policy decision on Navy enlisted personnel, it is necessary to appreciate the likely impact of the decision for the next several years. Moreover, the impact of a policy decision may be measured in many ways. This research memorandum describes the changes in expenditures, accession requirements, and promotion opportunity that would derive from changes in endstrength. The memorandum shows how the magnitude of strength cuts can be coordinated with the timing of strength cuts and realignment of billet structure to ensure that the Navy's transition from one size to another is as smooth as possible.

The analysis is based on the output of a simulation model, PERMIT (Personnel Management Integration Tool), developed at CNA. PERMIT is an inventory flow model that ages an inventory in both the short and long term. PERMIT simulates the effects and interaction of policy decisions over time. A detailed description of PERMIT may be found in [1].

OBJECTIVES

Personnel inventories can be changed in an almost endless number of ways. Inventories can be affected by changes in accession, advancement, sea/shore rotation, compensation, and high-year tenure policies, and it is often difficult to ascertain whether one set of policies is more desirable than another. To guide the analysis contained herein, objectives were established. The purpose of the objectives is to ensure that the Navy changes to a smaller desirable force structure, in a manner that minimizes adverse consequences on current and future Navy members. The objectives are as follows:

- Strength cuts should lead to a stable force structure.

- Advancement opportunity should be changed as little as possible.

- Endstrength cuts should be taken without having to extend involuntary separations beyond current policy.

PROJECTION SCENARIOS

PERMIT was used to project inventories that result from a variety of policy options for implementing endstrength cuts. The projections correspond to variations in both endstrength and pay-grade distributions. The projections are compared to provide an understanding of the relative impact of the various policy options on force structure.

The rationale for considering variations in pay-grade distribution is as follows. The Navy has an advancement system whereby personnel are promoted to fill vacancies. In an environment where billets are being removed from authorizations, there will be a sharp decline in advancement opportunity while the inventory is changing to new authorized levels. For example, there are approximately 10,000 E-8 billets in the Navy. Suppose there are approximately 2,000 E-8 vacancies (hence, promotions of E-7s) each year. If E-8 authorizations are instantly cut to 9,000, the number of vacancies will be halved to 1,000 during a year in which 2,000 E-8s move on (either to E-9 or out of the Navy), but only 1,000 of them are replaced. Thus, the advancement opportunity for E-7s will be halved for this transition year.

In subsequent years, advancement opportunity will rebound to previous levels as an equilibrium between personnel entering and leaving a pay grade is reestablished. Such transitional changes in advancement opportunity are likely to cause a drop in retention. Moreover, because the advancement system is the process by which the Navy rewards its best performers, a decline in advancement opportunity will hurt the personnel the Navy is most interested in rewarding. Declines in advancement opportunity from endstrength cuts may be offset by an increase in the proportion of senior billets. These justifications for an increase in the proportion of senior billets are from a personnel management perspective. In addition, as described next, Congress has authorized but not fully funded a Navy with a more senior mix of personnel than exists today. So, the Navy's requirements determination process also supports an increase in the proportion of senior personnel. Consequently, PERMIT was used to analyze the impact of changes in pay-grade distribution in conjunction with endstrength cuts.

The first projection provided a base case and an estimate of the enlisted inventory under existing conditions of a current endstrength of approximately 515,000 personnel containing 67 percent petty officers. The other six projections were based on combinations of variations in endstrength and the proportion of petty officers in the inventory. In

particular, endstrengths of 490,000, 480,000, and 460,000 were considered in conjunction with a pay-grade distribution of either 67 percent or 71 percent petty officers. The choices of 67 percent and 71 percent correspond to the levels of current inventories and Congressional authorizations (BA), respectively.[1] All strength targets with 67 percent petty officers were obtained through a proportional reduction in the strength of each pay grade from current inventory levels. An analogous procedure was applied to current BA levels, for those scenarios involving 71 percent petty officers.

Each projection produced a ten-year forecast for the scenario under consideration. The following sections of this memorandum display pertinent information from these projections.

To project the future, one must make a number of assumptions regarding future personnel behavior and use some common sense in interpreting the model results. PERMIT, as with all projection models, is only as good as the assumptions on which it is based. The most important assumption regards future continuation rates. All personnel projection models use historical data describing continuation behavior and extrapolate that information into the future to arrive at projections. PERMIT is no different from other models in this regard, and the projections shown herein are based on the presumption that the continuation behavior experienced by the Navy in FY 1988 will continue to be experienced for a number of years. Any inaccuracies in this assumption will lead to inaccuracies in model output.[2]

In all projections, high-year tenure points were assumed to be those currently enforced.[3] Consequently, the following projections include no involuntary separations beyond those resulting from current policy.

SCENARIO STRENGTH LEVELS

A starting point for the projections is the input of endstrength targets. The target inventories in each scenario are displayed, by grade, in table 1.

_____

1. Congress has authorized, without fully funding, a Navy with 71 percent petty officers.

2. Past experience suggests that such forecast errors mostly affect the absolute values of individual projections and have little, if any, effect on the relative size of different projections.

3. Current high-year tenure policy is that no E-3s may reenlist, and E-4 to E-8 personnel may serve no longer than 10, 20, 23, 26, and 28 years, respectively.

Table 1. Target inventories

Scenario	Petty officer share (%)	E-1 to E-3	E-4	E-5	E-6	E-7	E-8	E-9	Total
1	67	170,213	109,587	103,780	81,176	34,577	10,532	4,880	514,745
2	67	161,885	104,142	98,835	77,438	33,003	10,043	4,656	490,000
3	71	143,291	110,431	102,373	82,743	35,746	10,720	4,696	490,000
4	67	158,533	101,902	96,830	75,943	32,379	9,846	4,567	480,000
5	71	140,315	108,056	100,296	81,148	35,069	10,510	4,606	480,000
6	67	151,543	97,491	92,921	73,026	31,158	9,467	4,394	460,000
7	71	134,059	103,378	96,247	78,030	33,748	10,106	4,432	460,000

THE NEED FOR STABLE ACCESSION LEVELS

Consider scenario 7, which has an endstrength target of 460,000 personnel and contains 71 percent petty officers. Such a force would have nearly 55,000 fewer enlisted personnel than are on active duty today. It is feasible to attain such reductions in personnel size almost instantly. The Navy could introduce an involuntary separation program and drastically reduce its recruiting. However, each of these two options has major drawbacks.

The Navy has no experience of large, rapid force cuts including involuntary separations in the all-volunteer force era. Consequently, it is very difficult to make a confident assessment of the impact of such actions. An involuntary separation program would hurt morale and probably cause many top performers to voluntarily leave the Navy. Therefore, it is prudent that a program of involuntary separations should be adopted only if absolutely necessary, when there are no other viable means of reducing endstrength.

A drastic change in accession levels would produce imbalances in future force structure. Large differences in accession levels will give rise to future variations in experience levels. For example, suppose 80,000 personnel join the Navy in FY 1990 and 60,000 personnel join the Navy in FY 1991. These two cohorts would reach their first reenlistment decision points in 1994 and 1995, respectively, if one assumes all personnel have four-year obligations. Consequently, one would antici-pate many more losses in 1994 than in 1995 from personnel completing their first enlistment. Moreover, the relative imbalance between these two cohorts can be expected to persist over many years, leading to yearly variations in both experience levels and career personnel losses. Annual accessions are constrained to be the number of personnel required to meet strength needs by the end of the fiscal year. Thus, variations in losses give rise to variations in accession levels, which, in turn, give rise to future variations in losses, and so on. Persist-ent fluctuations in experience levels have a negative, if imprecise, effect on personnel readiness. Large fluctuations in accessions impose a great strain on the recruiting and training establishments and inhibit effective use of resources in these areas. PERMIT allows the user to avoid this situation by constraining accessions between user-specified limits. The PERMIT projections show that there is a limit to how fast one can cut endstrength while avoiding large fluctuations in annual accession requirements. The following example clarifies the situation.

PERMIT produced two sets of projections for scenario 7: The first projection allowed annual accessions to vary between 68,000 and 82,000; the second projection constrained accessions between 74,000 and 79,000 per year. Table 2 shows accession levels and resulting endstrength from the two projections.

Table 2. A rapid-versus-gradual decline in strength

Projection year	Rapid decline		Gradual decline	
	Accessions	Strength	Accessions	Strength
1	68,000[a]	492,000	74,000[a]	498,000
2	68,000[a]	474,000	74,000[a]	484,000
3	68,000[a]	459,000	74,000[a]	473,000
4	82,000[b]	461,500	74,000[a]	466,000
5	73,300	458,000	74,000[a]	461,500
6	78,000	460,000	74,000[a]	458,500
7	74,100	458,000	79,000[b]	460,000
8	81,500	462,000	76,900	459,500
9	74,500	458,500	78,900	460,500
10	82,000[b]	462,000	78,500	460,500

a. Minimum accessions.
b. Maximum accessions.

Table 2 needs some clarification before the results may be inter-
preted. PERMIT projects the number of accessions required to produce a
desired number of trained personnel. Endstrength is computed as the sum
of the number of trained personnel plus personnel in initial training.
Variations in annual accession levels will lead to subsequent variations
in trained strength levels. Consequently, the projections do not lead
to precise endstrength targets. Hence, the endstrength projections in
table 2 are not precisely 460,000.

Table 2 shows that a decline in endstrength to 460,000 may be
accomplished in either three or five years if one allows accession
levels to vary appropriately. If endstrength is cut in five years,
subsequent accession and endstrength levels are very stable. However,
if one cuts endstrength to 460,000 in three years, two problems are
evident from table 2. First, subsequent accession levels will vary
widely from one year to the next. Second, if the Navy attempts to keep
its trained work force to a stable size, an endstrength of 460,000 will
not be attained every year. Instead, endstrength will vary by several
thousand from one year to the next. Evidently, if the Navy does not
resort to involuntary separationns, an endstrength cut of 55,000 cannot
be accomplished in three years without instability in future personnel
inventories. Figures 1 and 2 illustrate the data in table 2.

The preceding paragraph showed that there is a limit to how rapidly
endstrength can be cut without causing a variety of problems with future
force stability. During the analysis of all other scenarios, PERMIT
projections included constraints on accessions to inhibit future insta-
bility. The size of accessions and corresponding endstrengths are
displayed in table 3 for each projection scenario.

Figure 1. Rapid strength decline
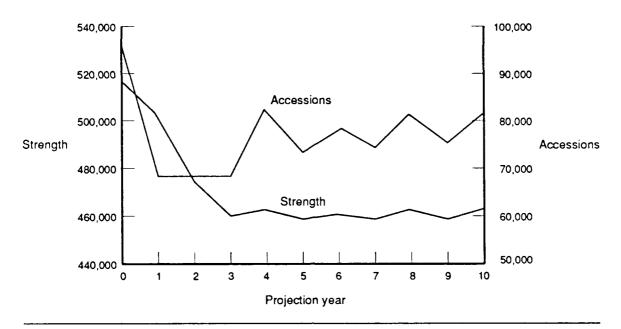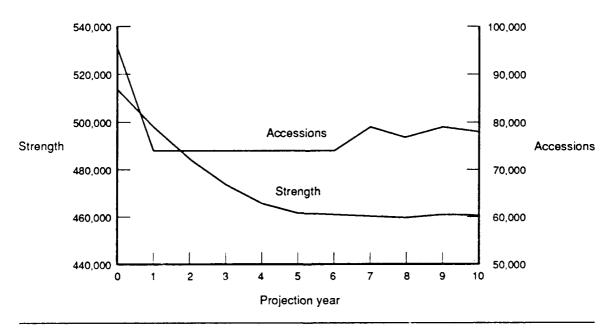

Figure 2. Gradual strength decline

Table 3. Various accession (A) and strength (S) projections (in thousands)

Projection year	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6		Scenario 7	
	A	S	A	S	A	S	A	S	A	S	A	S	A	S
1	92[b]	514.7	81[a]	504.5	79[a]	503	79[a]	502	78[a]	502	75[a]	498.5	74[a]	498
2	89.8	514.7	81[a]	496.5	79[a]	495.5	79[a]	492	78[a]	493	75[a]	484	74[a]	484.5
3	88.1	514.7	81[a]	490	79[a]	489.5	79[a]	483.5	78[a]	485	75[a]	471.5	74[a]	473
4	87[a]	514.7	83.5	489	84[b]	490.5	79[a]	479	78[a]	481.5	75[a]	463.5	74[a]	465
5	87.8	514.7	83.6	489	79.6	488.5	81.9	478.5	78[a]	479	75[a]	458.5	74[a]	461.5
6	88.5	514.7	83.4	489	83	490	82.2	479	81.4	480	80[b]	459.5	74[a]	458.5
7	88	514.7	83.7	489	80.5	489	81.7	478.5	79.3	479	78	458.5	79[b]	460
8	88.6	514.7	84.7	489.5	84[b]	490	82.7	479	81.5	480	79.8	459.5	77	459.5
9	89.6	514.7	85.4	490	82.5[b]	490	84[b]	480	81	480	79.7	459.5	79[b]	460.5
10	90.2	514.7	86[b]	490	84[b]	490	84	479.5	83[b]	480.5	80[b]	461	78.5	460.5

NOTE: Scenarios 1, 2, 4, and 6 have 67 percent petty officers; scenarios 3, 5, and 7 have 71 percent petty officers.

a. Minimum accessions.
b. Maximum accessions.

Table 3 requires some comment. An initial observation is that a change in the pay-grade distribution gives rise to differences in projected strength. The explanation is that differences in pay-grade distributions will give rise to variations in promotion rates, which, in turn, will cause variations in retention. PERMIT simulates this process and projects the resulting strength differences that will be caused by varying pay-grade distributions. As one might expect, the effect of a move toward a more senior pay-grade distribution is predicted to be a rise in retention and, consequently, a drop in accession requirements.

Table 3 shows a decline in accession levels as endstrength declines. In particular, the runs show a decline from current levels of 87,000 to 92,000 accessions for a strength of 515,000 to approximately 75,000 accessions for a strength of 460,000. The precise accession levels forecast by PERMIT are predicated on the continuation behavior assumed in the PERMIT runs. If future continuation rates are different from those used in these model runs, accession needs will vary. However, the differences in accession requirements that arise from variations in endstrength should be valid even under large changes in actual continuation rates.[1]

A final observation regarding table 3 concerns the rate at which endstrength declines. As one would expect, the larger the strength cuts, the more time it takes to implement them, assuming the Navy does not resort to involuntary separations and also endeavors to maintain stability in force structure. Thus, an orderly strength cut of approximately 25,000 can be implemented in three to four years, whereas a strength cut of 55,000 personnel takes five years to implement. Table 4 summarizes this information.

Table 4. Time required for orderly strength cuts

Endstrength alternatives	Size of end-strength cut	Required period of implementation
490,000	25,000	3 years
480,000	35,000	4 years
460,000	55,000	5 years

ADVANCEMENT OPPORTUNITY

The PERMIT projections show both the number of promotions and the average time to advance. Tables 5 through 10 show, for each PERMIT

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1. For example, alternate projections were carried out with attrition rates in the first year of service lowered by 5 percentage points. This had the effect of lowering annual accession levels in all scenarios by approximately 5,000, while maintaining the differences in accession levels between the scenarios.

projection, pertinent data for advancement of personnel in pay grades
E-4, E-5, and E-6 to pay grades E-5, E-6, and E-7, respectively. The
data are restricted to the above pay grades to avoid inundating the
reader with tables and also because over 95 percent of the Navy's petty
officers are in pay grades E-4 to E-7.

Any changes in strength levels are likely to be spread over a
number of years. The PERMIT projections reflect an attempt to adjust
strength to new pay-grade targets as rapidly as possible. Thus,
transitional effects to advancement opportunity all appear in the first
projection year and correspond to the cumulative effect on advancement
opportunity of a phased change in pay-grade distribution.

Scenario 1 represents a continuation of current strength into the
future and is used as the basis of all comparisons to determine the
impact of the various options for cutting strength. Scenarios 2, 4, and
6 represent strength cuts where the Navy remains at a mix of 67 percent
petty officers. Tables 5, 7, and 9 all show a one-year decline in the
number of advancements for scenarios 2, 4, and 6, followed by a rebound
to advancement levels similar to those in existence today. In addition,
the magnitude of the decline in advancements increases with the
magnitude of the strength cut. Scenarios 3, 5, and 7 represent strength
cuts where the Navy moves to a 71-percent petty officer force. Tables
5, 7, and 9 show that this richer mix of petty officers helps to offset
the decline in advancement opportunity.

Tables 6, 8, and 10 show how the average time at advancement will
vary with the various scenarios. These tables do show a slowdown in
promotion timing as the force is cut; however, the magnitude of the
slowdown is fairly small in most cases. The largest lengthening in time
to advancement is projected to occur for promotions between E-5 and E-6
for scenario 6, where endstrength is cut to 460,000 and petty officers
remain at 67 percent of inventory. In this situation, it may take
almost a year longer to be advanced at some points during the next ten
years. As was the case with the projections of numbers of advancements,
the slowdown in promotion timing can be offset by increasing the share
of petty officers in the force.

PERSONNEL LONGEVITY

Changing the size and structure of the Navy will affect the average
longevity of enlisted personnel. Table 11 shows how longevity is
projected to change over a ten-year period for the various scenarios.
In all cases, one observes an increase in longevity because the Navy has
grown in the eighties and a more experienced force is a natural conse-
quence of the aging of the large cohorts that joined the Navy this
decade. As force structure is cut, one observes an increase in average
longevity. This effect is caused by the manner in which personnel cuts
are being taken: the Navy reduces size by a combination of lower
accession levels coupled with loss rates that are held to current
values. The net result is a proportional shrinkage in the number of
less experienced personnel. Finally, an increase in the mix of petty
officers caused by an anticipated increase in retention) is also
projected to cause a slight rise in average longevity.

Table 5. Projected advancements from E-4 to E-5

	Scenario						
Item	1	2	3	4	5	6	7
Projection year							
1	25,600	14,600	26,900	10,200	22,200	2,000	13,200
2	26,400	24,800	26,500	24,200	25,800	22,600	24,500
3	26,000	24,600	26,200	24,000	25,500	22,800	24,300
4	26,000	24,600	26,100	24,000	25,500	23,000	24,300
5	26,000	24,600	26,000	24,100	25,500	23,000	24,300
6	26,000	24,700	26,100	24,200	25,500	23,200	24,400
7	26,200	24,900	26,300	24,400	25,700	23,400	24,700
8	26,400	25,300	26,600	24,800	26,100	23,900	25,100
9	27,200	26,000	27,300	25,600	26,900	24,700	25,900
10	27,900	26,900	28,200	26,400	27,700	25,600	26,800
E-4 strength	109,587	104,142	110,431	101,902	108,056	97,491	103,378
Total strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 6. Average time at advancement (E-4 to E-5)

Item	Scenario						
	1	2	3	4	5	6	7
Years of service by projection year							
1	4.9	4.9	4.9	4.9	4.9	4.9	4.9
2	4.6	4.9	4.6	5.0	4.7	5.2	4.9
3	4.7	4.9	4.6	4.9	4.7	5.1	4.9
4	4.7	4.9	4.7	5.0	4.7	5.1	4.9
5	4.7	4.9	4.6	4.9	4.7	5.1	4.9
6	4.7	4.8	4.6	4.9	4.7	5.0	4.8
7	4.7	4.8	4.6	4.8	4.7	4.9	4.7
8	4.7	4.8	4.6	4.8	4.6	4.8	4.7
9	4.7	4.7	4.6	4.7	4.6	4.8	4.6
10	4.7	4.7	4.5	4.7	4.5	4.7	4.5
E-4 strength	109,587	104,142	110,431	101,902	108,056	97,491	103,378
Total strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 7. Projected advancements from E-5 to E-6

Item	Scenario						
	1	2	3	4	5	6	7
Projection year							
1	12,700	6,700	15,500	4,300	12,900	0	7,900
2	12,000	11,600	12,200	11,400	12,000	10,700	11,700
3	11,700	11,300	11,900	11,200	11,700	10,900	11,400
4	11,700	11,400	11,900	11,200	11,700	11,000	11,400
5	11,700	11,300	11,800	11,200	11,700	10,900	11,400
6	11,700	11,400	11,900	11,200	11,700	11,000	11,400
7	12,000	11,600	12,100	11,500	12,000	11,200	11,700
8	12,200	11,900	12,400	11,700	12,200	11,400	11,900
9	12,900	12,500	13,100	12,400	12,900	12,100	12,600
10	13,600	13,200	13,700	13,100	13,600	12,800	13,300
E-5 strength	103,780	98,835	102,373	96,830	100,296	92,921	96,247
Total strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 8. Average time at advancement (E-5 to E-6)

Item	Scenario						
	1	2	3	4	5	6	7
Years of service by projection year							
1	9.8	9.8	9.8	9.8	9.8	na	9.8
2	9.8	9.9	9.7	9.9	9.8	10.0	9.9
3	9.9	10.1	9.9	10.2	9.9	10.3	10.1
4	10.0	10.3	9.8	10.5	10.0	10.8	10.3
5	10.0	10.4	9.9	10.5	10.0	10.9	10.3
6	10.0	10.3	9.9	10.5	10.0	10.8	10.3
7	10.1	10.3	9.9	10.5	10.0	10.7	10.3
8	10.1	10.3	10.0	10.4	10.1	10.7	10.3
9	10.1	10.3	10.0	10.4	10.1	10.6	10.3
10	10.1	10.3	10.0	10.3	10.0	10.5	10.2
E-5 strength	103,780	98,835	102,375	96,830	100,296	92,921	96,247
Total strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 9. Projected advancements from E-6 to E-7

Item	Scenario						
	1	2	3	4	5	6	7
Projection year							
1	7,700	5,400	8,900	4,500	7,900	2,800	6,000
2	5,700	5,600	5,800	5,500	5,700	5,500	5,600
3	5,600	5,500	5,700	5,400	5,600	5,400	5,500
4	5,700	5,600	5,800	5,500	5,700	5,400	5,600
5	5,800	5,600	5,900	5,600	5,800	5,400	5,700
6	5,900	5,700	6,000	5,700	5,900	5,500	5,800
7	6,100	5,900	6,200	5,900	6,100	5,700	6,000
8	6,200	6,000	6,300	6,000	6,300	5,800	6,100
9	6,600	6,400	6,700	6,300	6,600	6,200	6,500
10	7,000	6,800	7,100	6,700	7,000	6,500	6,900
E-6 strength	81,176	77,436	82,443	75,943	81,148	73,026	78,030
Total strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 10. Average time at advancement (E-6 to E-7)

Item	Scenario						
	1	2	3	4	5	6	7
Years of service by projection year							
1	14.7	14.7	14.7	14.7	14.7	14.7	14.7
2	14.8	14.8	14.8	14.8	14.8	14.9	14.8
3	15.0	15.0	14.9	15.0	15.0	15.1	15.0
4	14.9	15.1	14.9	15.2	14.9	15.3	15.1
5	15.0	15.2	15.0	15.3	15.0	15.5	15.2
6	15.3	15.4	15.2	15.5	15.2	15.6	15.4
7	15.5	15.6	15.4	15.7	15.5	15.8	15.6
8	15.7	15.8	15.7	15.9	15.7	16.0	15.8
9	15.9	16.0	15.8	16.1	15.9	16.2	16.0
10	16.0	16.1	15.9	16.2	16.0	16.3	16.1
E-4 strength	81,176	77,436	82,743	75,943	81,148	73,026	78,030
Total strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 11. Average longevity (years of service)

Item	Scenario						
	1	2	3	4	5	6	7
Years of service by projection year							
1	6.2	6.3	6.3	6.3	6.3	6.3	6.3
2	6.3	6.4	6.4	6.5	6.5	6.5	6.5
3	6.3	6.5	6.6	6.6	6.6	6.7	6.7
4	6.4	6.6	6.7	5.7	6.7	6.8	6.8
5	6.5	6.6	6.7	6.7	6.8	6.8	6.9
6	6.6	6.7	6.8	6.7	6.8	6.9	7.0
7	6.6	6.7	6.8	6.8	6.9	6.8	7.0
8	6.6	6.7	6.8	6.8	6.9	6.8	7.0
9	6.6	6.7	6.8	6.7	6.9	6.8	6.9
10	6.6	6.7	6.8	6.7	6.8	6.7	6.9
End strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

These projected increases in longevity are desirable because a more
experienced force is a more productive force. Reference [2] contains a
survey of analyses in this area and notes that, although results are
imprecise, they do indicate that experience is more closely related to
productivity than other measures of quality, and career personnel are
two to three times as productive as first-term personnel.

COST SAVINGS

The purpose of these strength cuts is to save money. So, it is
appropriate to conclude this analysis with a discussion of the savings
that would result from the various strength cuts considered herein.
PERMIT projects the regular military compensation (RMC) costs that
result from an inventory. Table 12 shows how RMC costs would vary over
the next ten years with each scenario. After the inventories have made
the transition to a new authorized level, there would be stable annual
savings in RMC, which are summarized in table 13.

Table 13 shows that an increase in the petty officer mix to 71
percent will cost $150 million per annum. This additional cost will
enable the Navy to maintain promotion opportunity while force size is
declining, and it should be considered in the context of annual RMC
expenditures of approximately $10 billion.

CONCLUSIONS AND RECOMMENDATIONS

The analysis in this research memorandum had the objectives of
determining whether enlisted endstrength can be cut in a way that
ensures future force stability, has a minimal impact on advancement
opportunity, and does not extend involuntary separations beyond current
policy. The foregoing analysis has shown that all these goals can be
accomplished by phasing strength cuts over a number of years and
simultaneously increasing the percentage of petty officers in the
inventory.

In addition, the analysis has shown that the length of time
required to make strength cuts will increase with the magnitude of the
strength cut. Moreover, if strength cuts are made too rapidly, there
will be future imbalances in inventories and accession requirements.
These results lead to an obvious recommendation that strength cuts
should be made over enough time to ensure future force stability.

If no other action is taken, declines in advancement opportunity
will occur as force size decreases. Advancements are the means by which
the Navy rewards its top performers. So, a decline in advancement
opportunity contradicts an important objective of Navy personnel
management. Reference [3] provides evidence that a decline in
advancement opportunities will have a disproportionately negative effect
on the retention of the Navy's high-quality personnel. So, a decline in
advancement opportunity should be avoided, if possible.

Table 12. Regular military compensation (RMC) costs (billions of FY 1989 dollars)

Item	Scenario						
	1	2	3	4	5	6	7
RMC cost by projection year							
1	10.11	9.96	10.04	9.92	10.00	9.83	9.91
2	10.14	9.84	9.93	9.76	9.87	9.60	9.70
3	10.16	9.74	9.85	9.62	9.76	9.39	9.52
4	10.18	9.71	9.83	9.54	9.70	9.25	9.40
5	10.19	9.71	9.84	9.52	9.66	9.17	9.34
6	10.19	9.72	9.85	9.52	9.66	9.15	9.28
7	10.20	9.72	9.85	9.52	9.66	9.14	9.27
8	10.20	9.72	9.85	9.52	9.66	9.14	9.27
9	10.20	9.71	9.85	8.52	9.66	9.13	9.26
10	10.20	9.71	9.84	9.51	9.64	9.11	9.26
End strength	514,745	490,000	490,000	480,000	480,000	460,000	460,000
Petty officer (%)	67	67	71	67	71	67	71

Table 13. Projected annual steady-state RMC savings

Scenario	Endstrength	Petty officer share (%)	Outyear RMC saving (FY 1989 $ millions)
2	490,000	67	500
3	490,000	71	350
4	480,000	67	700
5	480,000	71	550
6	460,000	67	1,050
7	460,000	71	900

A drop in advancement opportunity resulting from an endstrength cut can be largely offset by increasing the share of petty officers in the inventory. An increase from the current level of 67 percent petty officers to a Congressionally authorized but currently under-funded level of 71 percent petty officers was analyzed. Such an increase in the share of petty officers was projected to alleviate most of the decline in advancement opportunity.

An increase from 67 percent to 71 percent petty officers will reduce the RMC savings that will accrue from endstrength cuts. This cost needs to be considered in the context of total personnel costs and the benefits to be accrued from avoiding a major decline in promotion opportunity. It is difficult to quantify the precise effect that would be caused by a substantial drop in advancement opportunity. Given the uncertainties that abound in a time of rapidly changing force structure, it may be appropriate to consider an increase in the share of petty officers in the Navy as a hedge against declining retention.

REFERENCES

[1] CNA Research Memorandum 89-289, *The Design of PERMIT, A Personnel Management Integration Tool*, by David M. Rodney, forthcoming (27890289)[1]

[2] *Trends and Issues in U.S. Navy Manpower*, by Robert Lockman, Center for Naval Analyses, 1987 (96000800)

[3] CNA Research Contribution 518, *Retention and Career Force Quality*, by Alan J. Marcus, Jan 1984 (02051800)

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1. The number in parentheses is a CNA internal control number.